Age Standardized Rate (ASR) and Age Standardized Cancer Ratio (ASCR) of Nasopharyngeal Cancer in Kariadi Central Hospital during 2002 - 2011

MEDIA MEDIKA MUDA JOURNAL

Presented as the requirement to follow the research study report examination of the student research study S-1 program medical faculty

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UNDERGRADUATE MEDICAL EDUCATION PROGRAM
MEDICAL FACULTY
DIPONEGORO UNIVERSITY
2012

APPROVAL SHEET

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Age Standardized Rate (ASR) and Age Standardized Cancer Ratio (ASCR) of Nasopharyngeal Cancer in Kariadi Central Hospital during 2002 - 2011

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ABSTRACT

Background: *Every year in all over the world, the incidence of nasopharyngeal carcinoma increases. In Indonesia, there was no accurate data. To get an accurate result, without using this standardization, it would be unclear if differing mortality rates were due to age, sex or as a result of other factors. This study aimed to know the incidence of NPC in Kariadi Central Hospital during 2002 – 2011, the distribution trend based on age and sex, using the new WHO world standard, Age Standardization Rates (ASR) and Age Standardization Cancer Ratio (ASCR).*

Objectives: *This study aimed to know the incidence of nasopharyngeal cancer in Dr.Kariadi Central Hospital during 2002 – 2011, the distribution trend based on age and sex, by counting the age standardization rates (ASR) and age standardization cancer ratio (ASCR) score.*

Methods: *It was a descriptive retrospective research using secondary data from medical record of patients of nasopharyngeal carcinoma, diagnosed by Anatomic Pathology Laboratory of Kariadi Hospital-Medical Faculty Diponegoro University during January 1st,2002 - December 31st,2011. Data recorded were anatomic pathology diagnose that came from tissue biopsy or surgery, age & sex which were included clearly in medical record. The collected data were analysed by Microsoft Excel and presented descriptively.*

Result: *There was an increase in the number of NPC patients from year 2002 until 2011, which at the beginning there was only 20 patients in 2002 but then increased to 95 in 2011. The highest number of patient is in the range of 45-49 years old with a total of 78 patients. Based on sex, the women ASR is higher than men ASR, the comparison between men ASR and women ASR in year 2002-2011 is 1:1,4*

Conclusion: *The highest number of patient is in the range of 45-49 years old with a total of 78 patients. Based on age, ASR and ASCR are consistently increase, exept in year 2002 and 2003 if it compare with the study before and compare in every year. However, based on sex, this study does not follow the trend. It can be caused by unavailability of data in some groups of age, so that the counting result became inaccurate.*

Keywords: *Nasopharyngeal carcinoma, ASR, ASCR.*

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INTRODUCTION

The most common type of head and neck cancer is nasopharyngeal carcinoma (NPC).[1] NPC is a rare malignancy in most part of the world but much more common in South East Asia, North Africa and Greenland, and it is one of the most confusing, commonly misdiagnosed, and poorly understood disease.[2,3] NPC is a tumor arising from the epithelial cells that cover the surface and line the nasopharynx.[4] It is a squamous cell carcinoma that usually develops around the ostium of the Eustachian tube in the lateral wall of the nasopharynx.[5]

NPC has a remarkable racial and geographical distribution. It is believed that a number of etiological environmental factors along with genetic / host factors might be responsible for the causation of this cancer as the incidence is confined mainly to some population / ethnic groups or certain geographical region of the world. Ho *et al.* suggested that at least three etiological factors are ubiquitous Epstein Barr virus (EBV) infection, genetically determined susceptibility, and associated environmental factors are possibly contributing for the high incidence of NPC. NPC is the commonest epithelial cancer in adults with a peak occurrence between 40 and 60 years, and there are other likely etiological factors include genetic susceptibility. [6,7,8] Such living and dietary habits might have some role in the etiology of this cancer.[9] Consumption of food (in particular salted fish) containing carcinogenic volatile nitrosamines, and as in children, EBV.[8] Smoking, cooking, and working under poor ventilation, the use of nasal oils and balms for nose and throat problems, and the use of herbal medicines have also been

implicated but are in need of further verification. The people living in ill ventilated houses are inhaling smoke continuously for longer duration compared to those living in well-ventilated houses.[2] Likewise, chemical fumes, dusts, formaldehyde exposure, and radiation have all been implicated in this complicated disorder.

Age is a major determinant of cancer incidence. The risk of epithelial cancers, which comprise 90% of all cancers worldwide, increases approximately as a fifth power of age.[10] For many purposes, age-specific comparisons may be the most useful. Standardization (and other adjustment procedures) seeks to provide numbers and comparisons that minimize the influence of age and/or other extraneous factors. In direct standardization the stratum-specific rates of study populations are applied to the age distribution of a standard population. Standard is chosen should ideally be maintained for a number of years, during which time the age-structure of populations will alter. For this reason, attempting to match a particular standard to current population age structures is insufficient justification for choosing one standard over another. Hence, rather than selecting a standard to match the current age-structure of some population(s), the standard must be chosen to reflect the average age-structure of all populations to be compared over the period of use. [11] Comparisons across populations of the world should preferably be based on an average world population age structure and that average age structure should correspond to the period of likely use of a standard.

To facilitate comparisons globally, all age-standardized rates produced by WHO will be made according to the new WHO World Standard Population. Hopefully, this single standard will be widely adopted for global comparisons. [11,12]

ASCR devised by Tuyns (1968), which is calculated in a manner analogous to direct standardization using a set of standard proportion for all cancer. The ASCR score is the percentage of a given type of cancer in the series of cases.[8]

ASCR = Total (nx / Nx) Wx

nx : Number of new nasopharyngeal cancer cases of at age x

Nx : Number of new nasopharyngeal cases at all age

Wx : World standard proportion all cancer at age x

ASR has been calculated according to the direct method, using world standard population.

ASR = Total (nx / y . px) Wx for 100.000 population

nx : number of new nasopharyngeal cancer cases at age x

y : number of year on which rates are based

Px : number of person in population (who live in Semarang) at age x in the same sex

Wx : world standard population at age x [13]

METHODS

This study was done at Anatomical Pathology Laboratory of dr. Kariadi Central Hospital / Medical Faculty of Diponegoro University (MFDU) Semarang between February and June 2012. Based on the purposes, the study design is a retrospective descriptive study.

The population of this study were taken from medical records of NPC patients between January 1st 2002 and December 31st 2011 based on Anatomical Pathology diagnoses. Samples taken were all of the medical records patients who diagnosed Nasopharyngeal cancer between January 1st 2002 and December 31st 2011.

The total samples were taken purposively and the included criteria were medical record that clearly stated the diagnosis of nasopharyngeal cancer with sex data and address data. They also met the following exclusion criteria i.e, no histopathogic-data, no complete data (sex, age and address).

Collected data are secondary data from the medical records of nasopharyngeal cancer patients between January 1st 2002 and December 31st 2011 based on Anatomical Pathology diagnoses at Anatomical Pathology Laboratory of dr. Kariadi Central Hospital / Medical Faculty of Diponegoro University.

To analyze the data, first, reading the medical records, then assesing data completeness include anatomical pathology assessment, age, sex and address. The result finding would tabulated according to the category, then ASR and ASCR

score were analyzed. Collected datawere analyzed, and presented descriptively using Microsoft Excel,and discused for making a conclusion and suggestion.

RESULT

During January1st 2002 – December 31st 2011, there were 471 patients who have NPC, based on Anatomical Pathology diagnoses at Anatomical Pathology Laboratory of dr. Kariadi Central Hospital, and according to the inclusion and exclusion criteria. They consist of 313 men and 158 women. (2 : 1). The most prevalent were betwen 45 – 49 year old.

The description of patient based on age, sex and the city they came from can be viewed in the following figures : :

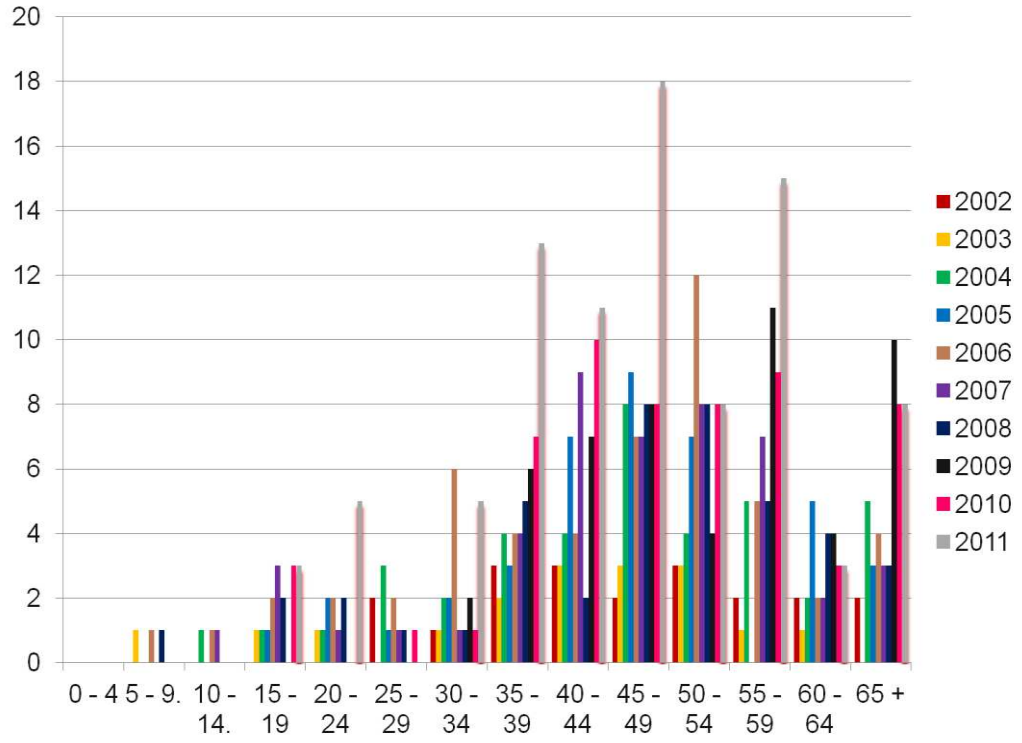

Figure 1 : All of NPC patients based on age

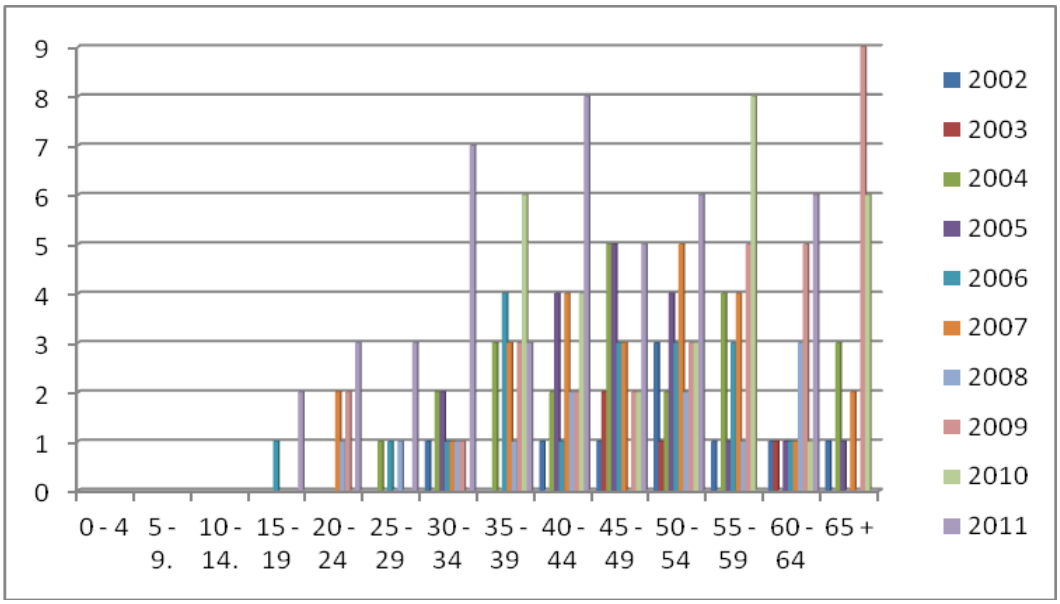

Figure 2 : NPC patients who lived in Semarang based on age

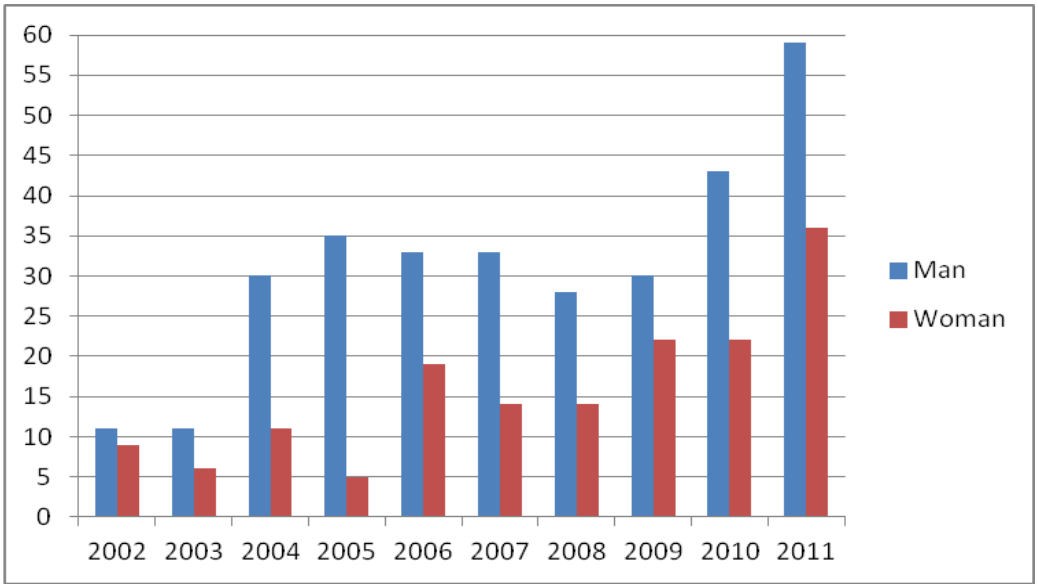

Figure 3 : All of NPC patients based on sex

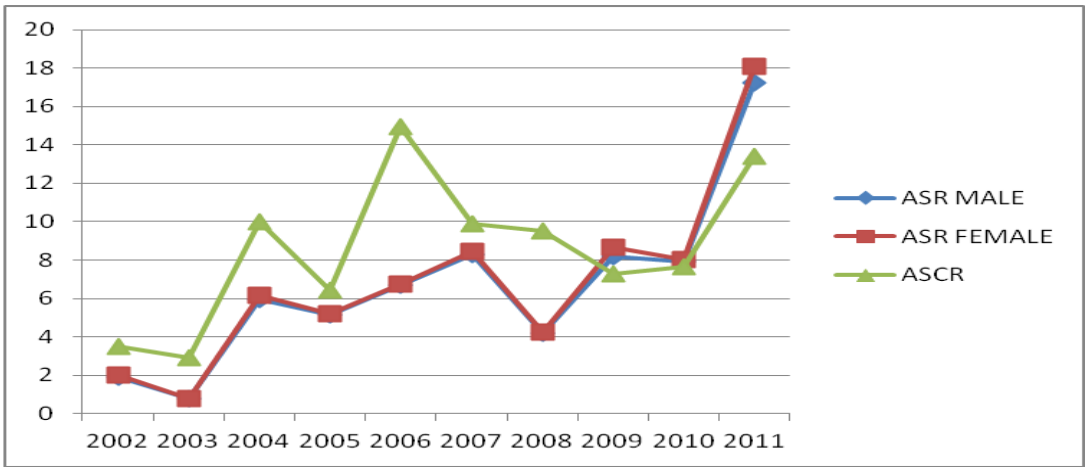

Figure 4 : ASR and ASCR score of NPC patients from 2002 through to 2011 at Dr. Kariadi Central Hospital

From the chart, we can clearly see the difference that there is a total increase in women ASR, men ASR, and ASCR score from year 2002 until 2011. The highest point is in 2011. With the ASCR score as big as 85,51, men ASR 66,26, and women ASR 68,35, then the comparison between men ASR and women ASR in year 2002-2011 is 1:1,03.

From the result , we can answer the hypothesis from this study that there is an increase in ASR and ASCR score from year to year in RSUP Dr. Kariadi Semarang from 2002-2011 and there is also a difference in the ratio of nasopharyngeal carcinoma incidence between men and women. But the ratio is does not follow the trend (the men ASR score is higher than women). Until now, researchers have not found references from other countries in which the women ASR is higher than men ASR. It can be caused by unavailability of data in some groups of age, so that the counting result became inaccurate.

DISCUSSION

To count ASR score for men and women, the population (Nx in ASR formula) are medical record of NPC patients who lived in Semarang, have a sex and age data, diagnose as NPC patient during January 1st 2002 until 31st 2011. And for ASCR, the population are medical record of NPC patients that clearly state the sex and the age of the patients.

From the result of this study, it can be seen clearly that there is an increase in the number of NPC patients from year 2002 until 2011, which at the beginning there was only 20 patients in 2002 but then increased to 95 in 2011. Generally, the highest number of patient is in the range of 45-49 years old with a total of 78 patients. This is also supported by the result of the study in other country. ASR score also can be seen clearly that there is an increase score from NPC patients during 2002 – 2011 compare with the study before, from Sarjadi.

Table 1. ASR and ASCR score of NPC period 1985 – 1989.[12]

Year	ASR		ASCR	
	Male	Female	Male	Female
1985	2,92	2,58	6,23	2,97
1986	4,51	1,16	7,15	1,03
1987	7,71	1,91	13,07	2,32
1988	3,72	1,99	7,41	2,04
1989	4,63	1,83	3,08	1,82

It means that with this methods which is compare the year and the age, can show the incidence of NPC is rises in every year, exept in 2002 until 2003, maybe it because no accurate data is available so the score is lower than a year before. However, based on sex, this study does not follow the trend (Men ASR score is higher than women ASR). Until now, researchers have not found references from other countries in which the women ASR is higher than men ASR. It can be caused by unavailability of data in some groups of age, so that the counting result became inaccurate. Or it may have been because of one or more factors which is actually related with the increase of nasopharyngeal carcinoma incidence in women, so there is a need to study more to unveil the relationship of that factor towards the incidence of nasopharyngeal carcinoma based on sex along with more accurate data to infere also a more accurate conclusion.

CONCLUSION

The highest number of NPC patient are betwen 45-49 years old with a total of 78 patients. Then followed by range of 50-54 years old with a total of 65 patients. Then 40-44 and 55-59 years old with a total of 60 patients. Based on age, ASR and ASCR during 2002 – 2011 are consistently increase, exept in year 2002 and 2003 if it compare with the study before (from Sarjadi)and compare in every year. And both of ASR and ASCR score are peaks in year 2011 which is 13,4 for ASCR, 17,23 for men ASR and 18,11 for women ASR. But based on sex, this study does not follow the trend, a women ASR is higher than men ASR. It can

be caused by unavailability of data in some groups of age, so that the counting result became inaccurate. Or it may have been because of one or more factors which is actually related with the increase of nasopharyngeal carcinoma incidence in women.

SUGGESTION

It is a need to study more to unveil the relationship of that factor towards the incidence of nasopharyngeal carcinoma based on sex along with more accurate data to infere also a more accurate conclusion. Also for Anatomical Pathology Laboratory of dr. Kariadi Central Hospital Semarang, its better if all of the medical record data is save in a software to make the resesarcher more easily to get the data, and complete the medical record data, for example the complete address of the patients so it makes the data clear enough and more accurate.

ACKNOWLEDGEMENT

Praises and thanks to Allah for all helps and permissions so the writer can finish this study even by hard effort and long time. Also for dr. Awal Prasetyo, M.Kes, Sp.THT-KL as our advisor who has given his valuable guardian, motivation, suggestion, and help during the writing process of this study. To Prof. Dr. dr. Sarjadi, Sp. PA (K) who has encouraged and advised us in the process of resolving this study. To my beloved parents, the entire family, all of my friends and all other person who can't be said one by one who always give me a moral and material support and helped the writer untill finishing process.

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